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European knowledge transfer reflected by research collaboration and patent citations indicators

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ABSTRACT

Knowledge transfer consists of activities that aim to capture and transmit knowledge, skills and competence from those who generate them to those who will transform them into socio-economic outcomes. In the context of the March 2000 Lisbon strategy and its aim to make the European Union the “world’s most dynamic and competitive knowledge economy”, knowledge transfer is considered to play an important role in helping to overcome obstacles such as a weak environment to stimulate high quality research and exploit research results. The introduction of new funding schemes and policies aimed at increasing knowledge flow between countries and sectors in Europe has increased the demand for studies of the impact of such policies and funding mechanisms and the development of relevant and accurate indicators related to them. The aim of this thesis was to study the dynamics of knowledge transfer in Europe and to examine how knowledge transfer can be measured and analysed through different indicators. This was done by studying co-authorships and collaborations within Europe as indicators of geographical knowledge transfer and patent citations as an indicator of sectoral knowledge flow.

The results showed that researchers from smaller countries co-authored more with other EU countries than those from bigger countries, while the co-authorship rate with extra-EU partners was not dependent on a country’s size. Co-authorship patterns were also found to depend on the scientific field. The analysis also indicated that multilateral collaborations funded through the EU Framework Programmes are more exclusively European in nature. In contrast, co-publication patterns in multilateral collaborations suggested that European researchers tend to co-author more with global, rather than exclusively European partners and that this global multilateral orientation in co-publications continues to rise.

When using co-publications as an indicator for geographical knowledge flow, the results demonstrated that European research policy most likely has had an impact on research collaboration patterns. However, the results also strongly suggested that any direct impact was limited and did not over-ride self-selected collaboration patterns that continue to drive a more global, rather than exclusively European, research collaboration orientation. A more disaggregated scrutiny of publication patterns also underscored very clearly that collaboration strategies show considerable diversity across scientific fields, as well as countries. Further, the results suggest that some policies, to support innovation in regions with a low absorptive capacity (weak innovation activities and a low tech profile) e.g. supporting regional R&D through subsidies, may be less successful than the incorporation of qualified personnel at firms or the increase of local university-industry links.

The thesis also made several contributions to the discussion of research methods in this field by investigating the utility of some central indicators and approaches. The results showed that the corresponding author is most likely to appear first and thereafter most-likely to appear last in the byline. However, the analysis also indicated that these results are dependent on the number of authors in a paper and that national differences also exist, thus arguing for a fine-tuning of bibliometric tools, in order to more effectively capture the relative importance of author contributions. Similarly, the analysis examined the use of patent citations as an indicator for science-industry links and geographical localization at a regional level. It found that there are reasons to question the use of this indicator, specifically in a region with low absorptive capacity. The related results also highlighted that there is a need to differentiate between applicant and examiner citations when examining the knowledge base since examiners and applicants add different types of knowledge.

Keywords: Knowledge transfer; indicators; author position; bibliometrics; corresponding author; co-authorship; EU; Europe; funding; international collaborations; networks; publications; research policy; research assessment;